least 50% sequence identity to the amino acid set forth in Table 1; said ECD is linked to a nucleic acid sequence encoding the amino acid sequence of at least one Fc, which has 50% sequence identity to the amino acid sequence set forth in Table 3; or

[0021] iv) a nucleic acid sequence of at least one ECD of CRACC, which has at least 50% sequence identity to the nucleotide sequence set forth in Table 2; said ECD is linked to a nucleic acid sequence of at least one Fc, which has 50% sequence identity to the amino acid sequence set forth in Table 4;

[0022] to thereby modulate an immune response in the subject.

[0023] Another aspect of the invention relates to a method of treating a subject having a condition that would benefit from upregulation of an immune response comprising administering to the subject an effective amount of at least one CRACC composition, said composition comprising a non-naturally occurring vector comprising:

[0024] i) a nucleic acid sequence encoding the amino acid sequence of at least one CRACC fusion, which has at least 50% sequence identity to the amino acid sequence set forth in Table 5;

[0025] ii) a nucleic acid sequence of a CRACC fusion, which has at least 50% sequence identity to the nucleotide sequence set forth in Table 6;

[0026] iii) a nucleic acid sequence encoding the amino acid sequence of at least one ECD of CRACC, which has at least 50% sequence identity to the amino acid set forth in Table 1; said ECD is linked to a nucleic acid sequence encoding the amino acid sequence of at least one Fc, which has 50% sequence identity to the amino acid sequence set forth in Table 3; or

[0027] iv) a nucleic acid sequence of at least one ECD of CRACC, which has at least 50% sequence identity to the nucleotide sequence set forth in Table 2; said ECD is linked to a nucleic acid sequence of at least one Fc, which has 50% sequence identity to the amino acid sequence set forth in Table 4;

[0028] to thereby modulate a CRACC-dependent pathway such that the condition that would benefit from upregulation of an immune response is treated.

[0029] In some embodiments, the immune response is induced or enhanced, or stimulated in the mammal.

[0030] In some embodiments, any of the aforementioned methods further comprises administering one or more additional compositions or therapies that upregulates an immune response or treats the condition.

[0031] In some embodiments, the one or more additional compositions or therapies is selected from the group consisting of anti-viral therapy, immunotherapy, chemotherapy, radiation, and surgery.

[0032] In some embodiments, the at least one CRACC fusion set forth in i)-iv) has at least two, three, four, five, six, seven, eight, nine, ten, or more mutations.

[0033] In some embodiments, the at least one mutation is a non-naturally occurring mutation.

[0034] In some embodiments, the non-naturally occurring vector is selected from the group consisting of adenovirus, adeno-associated virus (AAV), retrovirus, and lentivirus.

[0035] In some embodiments, the non-naturally occurring vector is a DNA-based vector.

[0036] In some embodiments, the non-naturally occurring vector is an adenoviral vector.

[0037] In some embodiments, the non-naturally occurring vector is a gene-therapy vector.

[0038] In some embodiments, the non-naturally occurring vector is a replication defective adenoviral vector.

[0039] In some embodiments, the non-naturally occurring vector comprises an adenovirus selected from non-human, human adenovirus serotype, or any adenovirus serotype developed as a gene transfer vector.

[0040] In some embodiments, the non-human adenovirus comprises an adenovirus selected from chimp, equine, bovine, mouse, chicken, pig, or dog.

[0041] In some embodiments, the adenovirus is human adenovirus serotype 5.

[0042] In some embodiments, the adenovirus has at least one mutation or deletion in at least one adenoviral gene.

[0043] In some embodiments, the adenoviral gene is selected from the group consisting of E1A, E1B, E2A, E2B, E3, E4, L1, L2, L3, L4, and L5.

[0044] In some embodiments, the adenovirus has a deletion in E1A, E1B, and E3, or combinations thereof.

[0045] In some embodiments, the at least one CRACC fusion is operatively linked to a transcriptional and translational regulatory sequences.

[0046] In some embodiments, the at least one CRACC fusion has at least 55%, 60%, 65%, 70%, 75%, 80%, 85%, 90%, or 95% sequence identity to the amino acid or nucleotide sequences set forth in Tables 1-6.

[0047] In some embodiments, the CRACC fusion is set forth in SEQ ID NO: 10.

[0048] In some embodiments, the CRACC fusion is set forth in SEQ ID NO: 11.

[0049] In some embodiments, any of the aforementioned methods further comprises administering in combination at least one therapeutic agent.

[0050] In some embodiments, the therapeutic agent is another vaccine, an immunomodulatory drug, a checkpoint inhibitor, or a small molecule inhibitor.

[0051] In some embodiments, the checkpoint inhibitor is selected from the group consisting of ant-PD1, anti-CTL4A, anti-VISTA, anti-TIM3, anti-CD47, and anti-LAG3.

[0052] In some embodiments, the CRACC composition is a pharmaceutically acceptable composition selected from the group consisting of excipients, diluents, and carriers.

[0053] In some embodiments, the pharmaceutical composition comprises the vector at a purity of at least 75%.

[0054] In some embodiments, the CRACC composition is an adjuvant.

[0055] In some embodiments, any of the aforementioned methods further comprises an antigen.

[0056] In some embodiments, the antigen is provide in a second adenoviral vector.

[0057] In some embodiments, the antigen is immunogenic.

[0058] In some embodiments, the antigen is an extracellular antigen.

[0059] In some embodiments, the antigen is a viral-associated antigen, pathogenic-associated antigen, protozoal-associated antigen, bacterial-associated antigen, fungal antigen, or tumor-associated antigen.

[0060] In some embodiments, the cancer is selected from the group consisting of acute lymphoblastic leukemia, acute myeloid leukemia, adrenocortical carcinoma, anal cancer,